What Is Claimed Is:

1. A detection article comprising:

at least one fluid control film layer having at least one microstructured major surface including a plurality of microchannels therein, the microchannels configured for uninterrupted fluid flow of a fluid sample throughout the article, the film layer including an acquisition zone wherein portions of the plurality of microchannels draw the fluid sample into the plurality of microchannels through openings in the microchannels at least by spontaneous fluid transport, and a detection zone in uninterrupted fluid communication with the acquisition zone along the microchannels, the detection zone including at least one detection element that facilitates detection of a characteristic of the fluid sample within at least one microchannel of the detection zone.

2. The detection article of claim 1, wherein at least one microchannel is comprised of sidewalls that are configured to define the microchannel, and the sidewalls extend continuously from the opening of that microchannel and through the acquisition and detection zones of the detection article with the detection element supported within **a** continuous microchannel.

3. The detection article of claim 2, further comprising a plurality of microchannels that are each comprised of sidewalls that extend from the opening in that microchannel through the acquisition and detection zones to define a plurality of continuous microchannels that provide discrete fluid transfer paths from one another.

4. The detection article of claim 3, wherein one of the plurality of continuous microchannels supports a different detection element from a detection element that is supported within another of the plurality of continuous microchannels.

5. The detection article of claim 1, further comprising an intermediate zone extending between the acquisition zone and the detection zone.

6. The detection article of claim 1, wherein at least a portion of the film layer is hydrophilic.

7. The detection article of claim 6, wherein the hydrophilic portion of the film layer comprises a hydrophilic material.

8. The detection article of claim 7, wherein the hydrophilic material is poly(vinyl alcohol).

9. The detection article of claim 7, wherein the hydrophilic material comprises a less hydrophilic material combined with an additive to increase hydrophilicity.

10. The detection article of claim 6, wherein the hydrophilic portion of the film layer comprises a less hydrophilic material that is coated to increase hydrophilicity.

11. The detection article of claim 10, wherein the coating comprises a thin film inorganic coating.

12. The detection article of claim 11, wherein the inorganic coating comprises SiO_2.

13. The detection article of claim 1, wherein the microstructured surface is configured to modify a surface energy of the surface to improve spontaneous fluid transport into and along the microchannels.

14. The detection article of claim 1, further comprising a cap layer positioned adjacent the microstructured surface to at least partially cover a portion of the microchannels.

15. The detection article of claim 14, wherein the cap layer completely covers the microchannels.

16. The detection article of claim 14, wherein the cap layer covers a portion of the channels within the acquisition zone to increase spontaneous fluid transport into and along the microchannels.

17. The detection article of claim 14, wherein the cap layer comprises an aperture formed within the detection zone.

18. The detection article of claim 17, wherein the aperture is sized to extend over a portion of all microchannels of the detection zone.

19. The detection article of claim 14, wherein the cap layer further comprises a substantially transparent portion at least positioned within the detection zone.

20. The detection article of claim 19, wherein the cap layer is substantially transparent.

21. The detection article of claim 19, wherein the transparent portion comprises a substantially transparent material.

22. The detection article of claim 21, wherein the transparent material comprises a flat, substantially planar transparent film.

23. The detection article of claim 14, wherein the cap layer comprises a fluid control film having at least one microstructured major surface including a plurality of microchannels therein.

24. The detection article of claim 23, wherein the cap layer is substantially transparent.

25. The detection article of claim 24, wherein the microchannels of the microstructured surface of the cap layer are canted at an angle relative to a line normal to the microstructured surface to enhance transparency of the cap layer.

26. The detection article of claim 1, wherein the fluid control film layer further comprises two microstructured major surfaces including a plurality of microchannels therein, the microchannels of both microstructured surfaces configured for uninterrupted fluid flow of a fluid sample throughout the article.

27. The detection article of claim 26, wherein the film layer further comprises at least one aperture that provides fluid communication between at least one microchannel on one major surface and at least one microchannel on the other major surface.

28. The detection article of claim 1, further comprises a plurality of fluid control film layers each having at least one microstructured major surface including a plurality of microchannels therein with the microchannels configured for uninterrupted fluid flow of a fluid sample throughout the article, the plurality of film layers positioned adjacent one another in a stacked configuration.

29. The detection article of claim 28, wherein at least one of the plurality of film layers comprises a second microstructured major surface including a plurality of microchannels therein.

30. The detection article of claim 28, further comprises a cap layer positioned adjacent a topmost microstructured surface of the stacked configuration to at least partially cover a portion of the microchannels of that topmost surface.

31. The detection article of claim 28, wherein at least one of the plurality of film layers comprises microchannels having a different configuration than the microchannels of at least one other film layer.

32. The detection article of claim 28, wherein at least one of the plurality of film layers comprises at least one aperture providing fluid communication between that film layer and at least one adjacent film layer.

33. The detection article of claim 28, wherein the detection zone comprises a plurality of detection elements.

34. The detection article of claim 33, wherein at least one of the plurality of detection elements is associated with a different film layer than at least one other of the plurality of detection elements.

35. The detection article of claim 34, wherein at least one detection element is associated with each microchannel of each film layer of the detection article.

36. The detection article of claim 33, wherein at least one of the plurality of detection elements is different than at least one other of the detection elements.

37. The detection article of claim 35, wherein each detection element is different than all other detection elements.

38. The detection article of claim 37, wherein a different detection element is associated with each microchannel of each film layer of the detection article.

39. The detection article of claim 1, wherein the at least one detection element is associated with at least one microchannel of the film layer.

40. The detection article of claim 39, wherein the at least one detection element is positioned within one of the plurality of microchannels.

41. The detection article of claim 39, wherein the at least one detection element is positioned adjacent one of the plurality of microchannels.

42. The detection article of claim 41, further comprising a cap layer positioned adjacent the microstructured surface to at least partially cover a portion of the microchannels, and wherein the at least one detection element is provided as part of the cap layer.

43. The detection article of claim 1, wherein the detection zone comprises a plurality of detection elements.

44. The detection article of claim 43, wherein at least one of the plurality detection element is associated with each microchannel of the film layer.

45. The detection article of claim 44, wherein at least one of the plurality of detection elements is positioned within one of the plurality of microchannels.

46. The detection article of claim 44, wherein at least one of the plurality of detection elements is positioned adjacent one of the plurality of microchannels.

47. The detection article of claim 46, further comprising a cap layer positioned adjacent the microstructured surface to at least partially cover a portion of the microchannels, and wherein the at least one of the plurality of detection elements is provided as part of the cap layer.

48. The detection article of claim 47, wherein at least one of the plurality of detection elements is positioned within one of the plurality of microchannels and at least one of the plurality of detection elements is provided as part of the cap layer.

49. The detection article of claim 43, wherein at least one of the plurality of detection elements is different than at least one other of the detection elements.

50. The detection article of claim 49, wherein each detection element is different than all other detection elements.

51. The detection article of claim 43, wherein at least one of the plurality of detection elements comprises a hardware device.

52. The detection article of claim 51, wherein the hardware device is chosen from the group consisting of microelectronic devices, microoptical devices and micromechanical devices.

53. The detection article of claim 43, wherein at least one of the plurality of detection elements comprises an assay reagent.

54. The detection article of claim 53, wherein the assay reagent is chosen from the group consisting of fluorogenic indicators, chromogenic indicators, electrochemical reagents, agglutination reagents, analyte specific binding agents, amplification agents, enzymes, catalysts, photochromic agents, dielectric compositions, analyte specific reporters, enzyme-linked antibody probes, DNA probes, RNA probes, fluorescent beads, and phosphorescent beads.

55. The detection article of claim 43, wherein at least one of the plurality of detection elements comprises a sample purification material.

56. The detection article of claim 55, wherein the sample purification material is chosen from the group consisting of filtration elements, chromatographic elements, electrophoretic elements, analyte specific binding agents, antibodies, antibody fragments, DNA probes and solid supports.

57. The detection article of claim 56, wherein the solid support is chosen from the group consisting of a bead, thread, porous media, free standing membranes and gels.

58. The detection article of claim 1, wherein the at least one detection element comprises a hardware device.

59. The detection article of claim 58, wherein the hardware device is chosen from the group consisting of microelectronic devices, microoptical devices and micromechanical devices.

60. The detection article of claim 1, wherein the at least one detection element comprises an assay reagent.

61. The detection article of claim 60, wherein the assay reagent is chosen from the group consisting of fluorogenic indicators, chromogenic indicators, electrochemical reagents, agglutination reagents, analyte specific binding agents, amplification agents, enzymes, catalysts, photochromic agents, dielectric compositions, analyte specific reporters, enzyme-linked antibody probes, DNA probes, RNA probes, fluorescent beads, and phosphorescent beads.

62. The detection article of claim 1, wherein the at least one detection element comprises a sample purification material.

63. The detection article of claim 62, wherein the sample purification material is chosen from the group consisting of filtration elements, chromatographic elements,

electrophoretic elements, analyte specific binding agents, antibodies, antibody fragments, DNA probes and solid supports.

64. The detection article of claim 63, wherein the solid support is chosen from the group consisting of a bead, thread, porous media, free standing membranes and gels.

65. The detection article of claim 1, further comprising an additional detection element located outside of the detection zone.

66. The detection article of claim 1, further comprising a handle to facilitated handling and manipulation of the detection article.

67. The detection article of claim 1, wherein the film layer further comprises a plurality of acquisition zones.

68. The detection article of claim 67, wherein the film layer is separable into a plurality of acquisition zones.

69. The detection article of claim 67, wherein the microchannels of the plurality of acquisition zones converge together into the detection zone.

70. The detection article of claim 67, wherein the film layer further comprises a plurality of detection zones, each detection zone corresponding to at least one acquisition zone.

71. The detection article of claim 70, wherein each of the plurality of detection zones corresponds to one of the plurality of acquisition zones.

72. The detection article of claim 1, wherein the openings in the microchannels are provided at one end of the plurality of microchannels.

73. The detection article of claim 72, wherein the microchannels are configured so as to position the openings of the microchannels across a width of the detection article.

74. The detection article of claim 72, wherein the microchannels are configured so as to position the openings of the microchannels along at least a portion of the length of the detection article.

75. The detection article of claim 1, wherein the openings in the microchannels are provided at a top surface of the microchannels.

76. The detection article of claim 75, further comprising a cap layer positioned adjacent the microstructured surface to at least partially cover a portion of the microchannels, and wherein the cap layer comprises an aperture located adjacent the acquisition zone providing access to the openings in the microchannels.

77. The detection article of claim 1, wherein the detection zone at least partially overlaps the acquisition zone.

78. The detection article of claim 1, further comprising at least one support layer removably positioned adjacent the film layer.

79. The detection article of claim 78, further comprising a cap layer separably positioned adjacent the microstructured surface of the film layer to at least partially cover a portion of the microchannels.

80. The detection article of claim 79, wherein the film layer is replaceable by another film layer.

81. The detection article of claim 1, wherein the microchannels are defined by sidewalls and a bottom wall between them.

82. The detection article of claim 1, wherein the microchannels are defined by sidewalls that converge together at a bottom of the microchannel.

83. The detection article of claim 1, wherein the microchannels extend continuously over the film layer.

84. The detection article of claim 1, wherein the microchannels extend from one side edge of the film layer to another side edge of the film layer.

85. The detection article of claim 1, wherein the characteristic of the fluid sample to be detected is chosen from the group consisting of color change, fluorescence, luminescence, turbidity, electrical conductivity, voltage change, light absorption, light transmission, pH, and change in physical phase.

86. A method of analyzing a fluid sample comprising the steps of:

providing a detection article, the detection article comprising at least one fluid control film layer having at least one microstructured major surface including a plurality of microchannels therein, the microchannels configured for uninterrupted fluid flow of a fluid sample throughout the article, the film layer including an acquisition zone wherein portions of the plurality of microchannels draw the fluid sample into the plurality of microchannels through openings in the microchannels at least by spontaneous fluid transport, and a detection zone in uninterrupted fluid communication with the acquisition zone along the microchannels, the detection zone including at least one detection element that facilitates detection of a characteristic of the fluid sample within at least one microchannel of the detection zone;

acquiring the fluid sample within the detection article by placing the acquisition zone of the detection article in fluid contact with the fluid sample; and

interacting the fluid sample with the at least one detection element by transport of the fluid sample along the microchannels so as to facilitate detection of a characteristic of the fluid sample within the detection zone.

87. The method of claim 86, further comprising the step of detecting the characteristic of the fluid sample within the detection zone of the detection article.

88. The method of claim 87, wherein the characteristic being detected is chosen from the group consisting of color change, fluorescence, luminescence, turbidity, electrical conductivity, voltage change, light absorption, light transmission, pH, and change in physical phase.

89. The method of claim 87, wherein the step of detecting further comprises placing the detection article in operational contact with a detection device suitable for detecting the characteristic of the fluid sample.

90. The method of claim 87, wherein the step of detecting further comprises viewing the characteristic within the detection zone.

91. The method of claim 90, wherein the detection article further comprises a cap layer including a viewable area located adjacent the detection zone and wherein the viewing occurs through the viewable area.

92. A method of manufacturing a detection article comprising the steps of:

providing at least one fluid control film layer having at least one microstructured major surface including a plurality of channels therein, the channels configured for uninterrupted fluid flow of a fluid sample along the layer;

providing an acquisition zone for the film layer in which portions of the plurality of microchannels are capable of drawing the fluid sample into the plurality of microchannels through openings in the microchannels at least by spontaneous fluid transport; and

providing a detection zone for the film layer which is in fluid communication with the acquisition zone along the channels, the detection zone including at least one detection element that facilitates detection of a characteristic of the fluid sample within at least one microchannel of the detection zone.

93. The method of claim 92, further comprising the step of providing a cap layer positioned adjacent the microstructured surface of the film layer.

94. The method of claim 93, wherein the step of providing the cap layer comprises laminating the cap layer onto the microstructured surface of the film layer.

95. The method of claim 92, wherein the step of providing the at least one film layer further comprises providing a plurality of film layers and stacking the plurality of film layers to form a three-dimensional detection article.

96. A microfluidic article with enhanced optical transmission comprising at least one fluid control film layer having at least one microstructured major surface including a plurality of microchannels therein, the microchannels configured for enhanced optical transmission through the film layer by canting of an included angle of the channels relative to a line normal to the microstructured major surface.

97. A microfluidic article with enhanced optical transmission comprising at least one fluid control film layer having at least one microstructured major surface including a plurality of fluid transfer microchannels that are defined by sidewalls that extend along at least a portion of the major surface of the fluid control film layer, the fluid control microchannels configured for enhanced optical transmission through the film layer by canting of an included angle of the channels, as defined by the sidewalls providing the fluid control microchannels, relative to a line normal to the microstructured major surface.

98. The microfluidic article of claim 97, wherein all microchannels are similar in form and cant so that the whole film layer is optically enhanced.

99. The microfluidic article of claim 97, wherein at least one portion of the microchannels are similar in form and cant so that that at least one portion of the film layer is optically enhanced.

100. The microfluidic article of claim 97, wherein both major surfaces are microstructured and include a plurality of fluid transfer microchannels that are defined by sidewalls that extend along at least a portion of the major surface of the fluid control film layer, the fluid control microchannels configured for enhanced optical transmission through the film layer by canting of an included angle of the channels, as defined by the sidewalls providing the fluid control microchannels, relative to a line normal to the microstructured major surface

101. A method of using a microfluidic article comprising the steps of:

providing a microfluidic article with enhanced optical transmission comprising at least one fluid control film layer having at least one microstructured major surface including a plurality of fluid transfer microchannels that are defined by sidewalls that extend along at least a portion of the major surface of the fluid control film layer, the fluid control microchannels configured for enhanced optical transmission through the film layer by canting of an included angle of the channels, as defined by the sidewalls providing the fluid control microchannels, relative to a line normal to the microstructured major surface;

providing a fluid into the fluid transfer microchannels; and

viewing a phenomenon related to the microfluidic article through the film layer with enhanced optical transmission.